UNIVERSITI MALAYA	**MAKLUMAT KURSUS UNTUK SEMESTER/PENGGAL SEMASA** ***COURSE INFORMATION FOR CURRENT SEMESTER/TERM***

Sesi Akademik *Academic Session*	2020/2021
Semester/Penggal *Semester/Term*	1
Kod Kursus *Course Code*	KIE4012
Tajuk Kursus *Course Title*	Nanoteknologi untuk Tenaga Mampan *Nanotechnology for Sustainable Energy*
Bahasa Pengantar *Medium of Instruction*	Bahasa Inggeris *English*
Rujukan Utama *Main Reference*	1. Jhavier Garcia-Martinez, Zhong Lin Wang, "Nanotechnology for the Energy Challenge," 2nd Edition, Wiley, 2013. 2. I. Dincer, C. Zamfirescu, "Sustainable Energy Systems and Applications," Springer, 2012.
Strategi Pembelajaran *Learning Strategies*	Kuliah, Kerja kursus, Seminar *Lectures, Coursework, Seminar*
Masa Pembelajaran Pelajar *Student Learning Time*	Bersemuka / *Face to face* : 31 jam/*hours* Tidak Bersemuka / *Non Face to face*: 0 jam/*hour* Masa Persediaan Pelajar / *Student Preparation Time*: 49 jam/*hours*
Kemahiran Boleh Pindah *Transferable Skills*	Perisian analisis unsur terhingga *Finite Element Analysis software*
Pensyarah / *Lecturer* Bilik / *Room* Telefon/e-mel *Telephone/e-mail*	Profesor Madya Ir. Dr. Suhana Mohd Said Bilik 10, Tingkat 2, Blok Y, Fakulti Kejuruteraan / *Room 10, Level 2, Block Y, Faculty of Engineering* +60379675399 / smsaid@um.edu.my
Sesi Kuliah / *Lecture Session:* Hari/Masa / *Day/Time* Tempat / *Venue*	Rujuk kepada myum.um.edu.my *Refer to myum.um.edu.my*
Sesi Tutorial/Amali: *Tutorial/Practical Session:* Hari/Masa / *Day/Time* Tempat / *Venue*	Tiada *None*
Perincian Pemberatan Penilaian *Detail of Assessment Weightage*	Penilaian Berterusan / *Continuous Assessment* : 40% Peperiksaan Akhir / *Final Examination* : 60%

Jadual Pengajaran / *Teaching Schedule*

Minggu *Week*	Topik & Aktiviti *Topic & Activities*	Rujukan *References*
1	Pengenalan kepada nanoteknologi: Penambahbaikan pencapaian melalui dimensi rendah *Introduction to nanotechnology: Performance enhancement through low dimensionality*	Rujukan utama *Main references*
2	Kriteria untuk teknologi tenaga mampan *Criteria for sustainable energy technologies*	Rujukan utama *Main references*
3	Sel solar – ringkasan prinsip operasi, status teknologi terkini, halangan kepada perkembangan teknologi *Solar cells – review of principle of operation, current status of technology, barriers to development*	Rujukan utama *Main references*
4	Nanoteknologi dalam sel solar Kajian kes 1: Nanoantenna *Nanotechnology in solar cells* *Case study 1: Nanoantennas*	Rujukan utama *Main references*
5	Termoelektrik – ringkasan prinsip operasi, status teknologi terkini, halangan kepada perkembangan teknologi *Thermoelectrics – review of principle of development, current status of technology, barriers to development*	Rujukan utama *Main references*
6	Nanoteknologi dalam termoelektrik Kajian kes 2: Kelahiran nanoteknologi dalam termoelektrik *Nanotechnology in thermoelectrics* *Case study 2: The birth of nanotechnology in thermoelectrics*	Rujukan utama *Main references*
7	Sel fuel – operasi asas, jenis sel fuel *Fuel cells –basic principle of operation, types of fuel cell*	Rujukan utama *Main references*
8	Potensi komersil sel fuel Kajian kes 3: Sel fuel vs Tesla *Commercial potential of fuel cells* *Case study 3: Fuel cells vs Tesla*	Rujukan utama *Main references*
9	Nanoteknologi dalam sel fuel *Nanotechnology in fuel cells*	Rujukan utama *Main references*
10	Struktur karbon 0D, 1D dan 2D: Dot kuantum, tiub nano karbon, graphene dalam peranti tenaga mampan *0D,1D and 2D carbon structures: Quantum dots, carbon nanotubes and graphene in sustainable energy devices*	Rujukan utama *Main references*
11	Selepas grafin *Beyond graphene*	Rujukan utama *Main references*
12	Bateri Kajian kes 4: Adakan bateri sebuah teknologi yang mengganggu sektor tenaga *Batteries* *Case study 4: Are batteries a disruptive technology in the power sector*	Rujukan utama *Main references*
13	Nanoteknologi dalam bateri *Nanotechnology in batteries*	Rujukan utama *Main references*
14	Peranan nanoteknologi dalam peranti tenaga mampan *The role of nanotechnology in sustainable energy devices*	Rujukan utama *Main references*